NEURAL SCIENCES AND BEHAVIOR

THE FORMATION OF NERVE CONNECTIONS. *A Consideration of Neural Specificity Modulation and Comparable Phenomena.*

By R. M. Gaze. Academic Press, London and New York. 80 s. viii + 288 p.; ill.; author and subject indexes. 1970.

This is an excellent compilation and unifying account of a voluminous literature on the growth and patterning of nerve connections, available heretofore only in widely scattered articles spread through the literature over a period of more than forty years. Gaze has searched back through the original evidence in detail and describes the salient features of the experimental findings clearly and with the insight and intimate perspective of one who has himself been active in the field and made major contributions for more than a decade. The book reads easily and should prove an invaluable introductory background for anyone who wishes to have more than a superficial knowledge of what has been learned about the way in which the developing vertebrate brain manages to grow its circuit connections in proper patterns that are appropriately preordered for adaptive behavior.

The author's primary concern is with the selectivity and ordering of nerve connection patterns rather than with the growth mechanics per se. It was only about thirty years ago that developmental doctrine stated that nerve outgrowth and the formation of nerve connections is mechanical and nonselective, when the whole concept of instinct and inbuilt behavior patterns was in scientific disrepute, and when most predictions would have held that a book of this sort would never be written. Gaze has been careful not to leave any undue impression that the final answers are already in and the problems and issues all settled. He is to be complimented also for his objective presentation of an array of crosscurrents of interpretation and opinion that have marked this field of investigation from the beginning. The perspective of the book is, in the main, closely focussed on the experimental data and its immediate interpretation, without attempts to relate the many implications which these developmental findings carry for neurophysiology, embryology, ethology, and other areas of neurobiology and behavioral science.

Occasional efforts to introduce original interpretation or to support the author's stated bias against behavioral and histological evidence in favor of the electrophysiological techniques that he himself has employed, or to assess some of the broader implications, are not the strongest features. In particular, the polar shifts in basic guideline concepts that occurred in the field in the early 1940's and which brought an about-face in the terms of interpretation (e.g., from diffuse non-selectivity in nerve growth to precise specificity, from functional plasticity to functional implasticity, from mechanical guidance to chemical guidance, from impulse specificity to connection specificity, and from neuronal specification at the organ level to specification at the individual cell level) are all left largely between the lines in this account or even missed or tossed off as minor shifts of emphasis. These shortcomings are peripheral, however, and do not seriously detract from the main substance of the volume. Overall, the author makes a contribution of lasting value in pulling together in a highly competent fashion and in easily comprehensible terms the content of this currently growing field. One of the author's students and a former research associate has come out almost simultaneously with a book covering the same material but in the much more diffuse context of neurogenesis in general (*Developmental Neurobiology,* by Marcus Jacobson; Holt, Rinehart and Winston, 1970). The difference in points of view and treatment is such that neither volume makes a substitute for the other.

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RECENT RESEARCH ON THE RETINA. *British Medical Bulletin. Volume 26, Number 2.*

Edited by E. S. Perkins. British Medical Bulletin, London. S6.50 (paper), P. 99–184 + 20 p. pl.: ill.; no index. 1970.

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